## Amendments to the Claims

1. **(Previously Presented)** A device, comprising a planar optical waveguide, as part of a sensor platform, and, connected to said platform directly or by means of a sealing medium, a layer (g) (according to Figure 1), said layer forming either directly a tight seal or by means of the sealing medium a tightly sealing layer, said device comprising a multitude of recesses at least open towards the sensor platform, which form a corresponding multitude of sample compartments in a 2-dimensional arrangement, wherein

in each of said sample compartments different biological or biochemical recognition elements, for the specific recognition and binding of different analytes, are immobilized in five or more discrete measurement areas (d) (according to Figure 1) in a two-dimensional array on said optical waveguide in these sample compartments, wherein said measurement areas are in optical interaction with the excitation light emanating from said optical waveguide, as part of a sensor platform which forms a demarcation of said sample compartments, wherein said sample compartments are operable to be cleared from received sample or reagent solutions and to receive, in the following, optionally without washing steps, further sample or reagent solutions, which are supplied to the same said sample compartments.

2. **(Original)** A device according to claim 1, wherein, in each of the sample compartments, out of the five or more measurement areas in a single sample compartment, one or more measurement areas are used for referencing.

3. **(Original)** A device according to claim 2, wherein measurement areas for referencing the same chemical or optical parameters are used in several sample compartments distributed over the sensor platform, so that the lateral distribution of said chemical or optical parameters over the sensor platform can be determined.

4. **(Previously Presented)** A device according to claim 1, wherein said measurement areas are in optical interaction with the evanescent field of excitation light guided in said planar optical waveguide.

5. **(Previously Presented)** A device according to claim 1, wherein the optical waveguide, as part of the sensor platform, is a multi-mode or single-mode waveguide comprising an anorganic material, preferably glass, or an organic material, preferably a plastic, which is preferably selected from the group comprising polymethylmethacrylate, polycarbonate or polystyrene, which materials are optically transparent at least at the excitation and a luminescence wavelength.

6. **(Previously Presented)** A device according to claim 1, wherein the optical waveguide, as part of the sensor platform, is self-supporting.

7. **(Previously Presented)** A device according to claim 1, wherein the optical film waveguide, as part of the sensor platform, is an optical film waveguide with a first optically transparent layer (a) (according to Figure 1) on a second optically transparent layer (b) (according to Figure 1) with lower refractive index than layer (a).

8. **(Original)** A device according to claim 7, wherein the material of the second optically transparent layer (b) comprises glass, quartz, or transparent thermoplastic plastics, preferably of the group comprising polycarbonate, polyimide, or polymethylmethacrylate, or polystyrene.

9. **(Previously Presented)** A device according to claim 7, wherein the refractive index of the first optically transparent layer (a) is higher than 1.8.

10. **(Previously Presented)** A device according to claim 7 , wherein the first optically transparent layer (a) comprises $TiO_2$, ZnO, $Nb_2O_5$, $Ta_2O_5$, $HfO_2$, or $ZrO_2$, preferably $Ta_2O_5$ or $Nb_2O_5$.

11. **(Previously Presented)** A device according to claim 7, wherein the thickness of the first optically transparent layer (a) is between 40 and 300 nm, preferably between 100 and 200 nm.

12. **(Previously Presented)** A device according to claim 7, wherein an additional optically transparent layer (b') (according to Figure 1) with lower refractive index than and in contact with layer (a), and with a thickness of 5 nm - 10 000 nm, preferably of 10 nm - 1000 nm, is located between the optically transparent layers (a) and (b).

13. **(Original)** A device according to claim 12, wherein the purpose of the intermediate layer is a reduction of the surface roughness below layer (a) or a reduction of the penetration of the evanescent field, of light guided in layer (a), into the one or more layers located below or an improvement of the adhesion of layer (a) to the one or more layers located below or a reduction of thermally induced stress within the optical sensor platform or a chemical isolation of the optically transparent layer (a) from layers located below, by sealing of micro pores in layer (a) against the layers located below.

14. **(Previously Presented)** A device according to claim 7, wherein an adhesion-promoting layer (f) is deposited on the optically transparent layer (a), for the immobilization of biological or biochemical or synthetic recognition elements.

15. **(Original)** A device according to claim 14, wherein the adhesion-promoting layer (f), has a thickness of less than 200 nm, preferably of less than 20 nm.

16. **(Previously Presented)** A device according to claim 14 , wherein the adhesion-promoting layer comprises chemical compounds of the group comprising silanes, epoxides, and "self-organized functionalized monolayers".

17. **(Previously Presented)** A device according to claim 1, wherein laterally separated measurement areas (d) are generated by laterally selective deposition of biological or biochemical or synthetic recognition elements on said sensor platform.

18. **(Original)** A device according to claim 17, wherein one or more methods of the group of methods comprising ink jet spotting, mechanical spotting by means of pin or pen, micro contact printing, fluidic contacting of the measurement areas with the biological or biochemical or synthetic recognition elements upon their supply in parallel or crossed micro channels, upon application of pressure differences or of electric or electromagnetic potentials, are applied for the deposition of the biological or biochemical or synthetic recognition elements.

19. **(Original)** A device according to claim 17, wherein, as biological or biochemical or synthetic recognition elements, components of the group comprising nucleic acids (DNA, RNA), antibodies, aptamers, membrane-bound and isolated receptors, their ligands, antigens for antibodies, ôhistidin-tag componentsö, cavities generated by chemical synthesis, for hosting molecular imprints. etc., are deposited.

20. **(Original)** A device according to claim 17, wherein whole cells or cell fragments are deposited as biological or biochemical or synthetic recognition elements.

21. **(Previously Presented)** A device according to claim 17, wherein compounds, which are "chemically neutral" towards the analyte, are deposited between the laterally separated measurement areas (d), in order to minimize nonspecific binding or adsorption.

22. **(Original)** A device according to claim 21, wherein said compounds, which are ôchemically neutralö towards the analyte, are selected from the groups comprising, for example, albumines such as bovine serum albumin, herring sperm, or polyethyleneglycols.

23. **(Previously Presented)** A device according to claim 7, wherein the incoupling of excitation light to the measurement areas (d) is performed by means of one or more grating structures (c) (according to Figure 1), which are formed in the optically transparent layer (a).

24. **(Previously Presented)** A device according to claim 7, wherein the outcoupling of light guided in the optically transparent layer (a) is performed by means of grating structures (c') (according to Figure 1), which are formed in the optically transparent layer (a).

25. **(Previously Presented)** A device according to claim 23, wherein the outcoupling of light guided in the optically transparent layer (a) is performed by means of grating structures (c') (according to Figure 1), which are formed in the optically transparent layer (a), and wherein grating structures (c) and (c') formed in the optically transparent layer (a) have the same or different periodicity and are arranged in parallel or not in parallel to each other.

26. **(Original)** A device according to claim 25, wherein grating structures (c) and (c') can interchangeably be used as incoupling and / or outcoupling gratings.

27. **(Previously Presented)** A device according to claim 7, wherein the grating structures (c) and optional additional grating structures (c') have a period of 200 nm - 1000 nm and a grating modulation depth of 3 nm - 100 nm, preferably of 10 nm - 30 nm.

28. **(Original)** A device according to claim 27, wherein the ratio of the modulation depth to the thickness of the first optically transparent layer (a) is equal or smaller than 0.2.

29. **(Previously Presented)** A device according to claim 7, wherein the grating structure (c) is a relief grating with rightangular, triangular or semi-circular profile or a phase or volume grating with a periodic modulation of the refractive index in the essentially planar optically transparent layer (a).

30. **(Previously Presented)** A device according to claim 7, wherein a thin metal layer, preferably of gold or silver, optionally on an additional dielectric layer of lower refractive index than layer (a), for example of silica or magnesium fluoride, is deposited between the optically transparent layer (a) and the immobilized biological or biochemical recognition elements, wherein the thickness of the metal layer and the optional, additional intermediate layer is selected in such a way, that a surface plasmon at the excitation wavelength and / or at the luminescence wavelength can be excited.

31. **(Previously Presented)** A device according to claim 7, wherein the grating structure (c) is a diffractive grating with a uniform period.

32. **(Previously Presented)** A device according to claim 7, wherein the grating structure (c) is a multi-diffractive grating.

33. **(Previously Presented)** A device according to claim 23, wherein grating structures (c) and optional additional grating structures (c') are located outside the region of the sample compartments.

34. **(Previously Presented)** A device according to claim 23, wherein grating structures (c) and optional additional grating structures (c') extend over the range of multiple or all sample compartments.

35. **(Previously Presented)** A device according to claim 23, wherein the material of the tightly sealing layer (g) in contact with the sensor platform, in the incumbant surface area, is optically transparent both for the excitation radiation and the excited luminescence radiation at least within the penetration depth of the evanescent field.

36. **(Original)** A device according to claim 35, wherein the layer (g) is provided in form of a two-layer system, the first layer of which, to be brought into contact with the surface of the sensor platform, being transparent for the excitation radiation and the excited luminescence radiation,

whereas the adjacent layer, being located more remote from the sensor platform, is absorbent in the spectral range of the excitation radiation and of the excited luminescence radiation.

37. **(Original)** A device according to claim 34, wherein the material of the tightly sealing layer (g) in contact with the sensor platform is absorbent in the spectral range of the excitation radiation and of the excited luminescence radiation.

38. **(Previously Presented)** A device according to claim 1, wherein the material of the tightly sealing layer (g) in contact with the sensor platform is self-adhesive.

39. **(Previously Presented)** A device according to claim 1, wherein the material of the tightly sealing layer (g) in contact with the sensor platform comprises a polysiloxane.

40.**(Previously Presented)** A device according to claim 1, wherein 5 - 1000, preferably 10 - 400 measurement areas are located in one sample compartment.

41. **(Previously Presented)** A device according to claim 1, wherein an individual measurement area in a sample compartment occupies an area of 0.001 - 6 $mm^2$, wherein different measurement areas can have similar or different size.

42. **(Previously Presented)** A device according to claim 1, wherein the sample compartments have a volume of 100 nl - 1 ml each.

43. **(Previously Presented)** A device according to claim 1, wherein, at the side facing away from the optically transparent layer (a), the sample compartments are closed except for inlet and outlet openings for the supply or removal of samples and optional additional reagents, and wherein the supply or removal of samples and optional additional reagents is performed in a closed flow-through system, and wherein in case of liquid supply to measurement areas or segments with

common inlet and outlet openings said inlet and outlet openings are preferably addressed row by row or column by column.

44. **(Previously Presented)** A device according to claim 1, wherein the supply of samples and optional additional reagents is performed in parallel or crossed micro channels, affected by pressure differences or by electric or by electromagnetic potentials.

45. **(Previously Presented)** A device according to claim 1, wherein the sample compartments have openings for the locally addressed supply or removal of samples or other reagants at the side facing away from the optically transparent layer (a).

46. **(Previously Presented)** A device according to claim 1, wherein compartments are provided for reagents, which are wetted and brought into contact with the measurement areas during the assay.

47. **(Previously Presented)** A device according to claim 1, wherein optically or mechanically recognizable marks are provided on the sensor platform, in order to facilitate the adjustment in an optical system and / or to facilitate the combination of the sensor platform with the layer (g) comprising the recesses for the sample compartments.

48. **(Previously Presented)** An analytical system for the determination of one or more luminescences, comprising

a. at least one excitation light source

b. a device according to claim 1

c. at least one detector for recording the light emanating from the at least one or more measurement areas (d) on the sensor platform.

49. **(Previously Presented)** An analytical system according to claim 48, wherein the optical film waveguide, as part of the sensor platform, is an optical film waveguide with a first optically

transparent layer (a) (according to Figure 1) on a second optically transparent layer (b) (according to Figure 1) with a lower refractive index, and wherein the excitation light emitted by the at least one light source is coherent and directed onto the one or more measurement areas at the resonance angle for incoupling into the optically transparent layer (a).

50. **(Original)** An analytical system according to claim 49, wherein the excitation light of at least one light source is expanded to an essentially parallel ray bundle by an expansion optics and directed onto the one or more measurement areas at the resonance angle for incoupling into the optically transparent layer (a).

51. **(Original)** An analytical system according to claim 49, wherein the excitation light from at the least one light source is devided, by means of one or, in case of several light sources, by means of multiple diffractive optical elements, preferably Dammann gratings, or refractive optical elements, preferably micro-lens arrays, into a multitude of individual beams, with as similar intensity as possible of the individual beams originating from a common light source, which individual beams are directed essentially in parallel to each other onto laterally separated measurement areas.

52. **(Original)** An analytical system according to claim 49, wherein two or more coherent light sources with equal or different emission wavelength are used as excitation light sources.

53. **(Previously Presented)** An analytical system according to claim 48, wherein at least one laterally resolving detector is used for detection.

54. **(Original)** An analytical system according to claim 53, wherein at least one detector from the group formed by CCD cameras, CCD chips, photodiode arrays, Avalanche diode arrays, multi-channel plates, and multi-channel photomultipliers is used as the at least one laterally resolving detector.

55. **(Previously Presented)** An analytical system according to claim 48, wherein optical components of the group comprising lenses or lens systems for the shaping of the transmitted light bundles, planar or curved mirrors for the deviation and optionally additional shaping of the light bundles, prisms for the deviation and optionally spectral separation of the light bundles, dichroic mirrors for the spectrally selective deviation of parts of the light bundles, neutral density filters for the regulation of the transmitted light intensity, optical filters or monochromators for the spectrally selective transmission of parts of the light bundles, or polarization selective elements for the selection of discrete polarization directions of the excitation or luminescence light are located between the one or more excitation light sources and the sensor platform and / or between said sensor platform and the one or more detectors.

56. **(Previously Presented)** An analytical system according to claim 48, wherein the excitation light is launched in pulses with duration of 1 fsec to 10 min.

57. **(Previously Presented)** An analytical system according to claim 48 , wherein the emission light from the measurement areas is measured time-resolved.

58. **(Previously Presented)** An analytical system according to claim 48, wherein for referencing purposes light signals of the group comprising excitation light at the location of the light sources or after expansion of the excitation light or after its multiplexing into individual beams, scattered light at the excitation wavelength from the location of the one or more laterally separated measurement areas, and light of the excitation wavelength outcoupled by the grating structures (c) or (c') are measured.

59. **(Original)** An analytical system according to claim 58, wherein the measurement areas for determination of the emission light and of the reference signal are identical.

60. **(Previously Presented)** An analytical system according to claim 48, wherein launching of the excitation light and detection of the emission light from the one or more measurement areas is performed sequentially for one or more sample compartments.

61. **(Original)** An analytical system according to claim 60, wherein sequential excitation and detection is performed using movable optical components of the group comprising mirrors, deviating prisms, and dichroic mirrors.

62. **(Original)** An analytical system according to claim 61, wherein sequential excitation and detection is performed using an essentially focus and angle preserving scanner.

63. **(Previously Presented)** An analytical system according to claim 60, wherein the sensor platform is moved between steps of sequential excitation and detection.

64. **(Previously Presented)** A method for determination of one or more analytes by luminescence in one or more samples on at least five, laterally separated measurement areas, with a device, comprising a planar optical waveguide, as part of a sensor platform, and, connected to said platform directly or by means of a sealing medium, a layer (g), said layer forming either directly a tight seal or by means of the sealing medium a tightly sealing layer, said device comprising a multitude of recesses at least open towards the sensor platform, which form a corresponding multitude of sample compartments in a 2-dimensional arrangement, wherein
in each of said sample compartments different biological or biochemical recognition elements, for the specific recognition and binding of different analytes, are immobilized in five or more discrete measurement areas (d) in a two-dimensional array on said planar optical waveguide in these sample compartments, wherein said measurement areas are in optical interaction with the excitation light emanating from said optical waveguide, as part of a sensor platform which forms a demarcation of said sample compartments, wherein said sample compartments are operable to be cleared from received sample or reagent solutions and to receive, in the following, optionally without washing steps, further sample or reagent solutions, which are supplied to the same said sample compartments,

and wherein excitation light is directed to the measurement areas, leading to excite substances capable of luminescence in the samples or on the measurement areas to emit luminescence, and wherein the emanated luminescence is measured.

65. **(Original)** A method according to claim 64, wherein the said measurment areas are in optical interaction with the evanescent field of excitation light guided in the planar optical waveguide.

66. **(Previously Presented)** A method according to claim 65, wherein the optical film waveguide, as part of the sensor platform, is an optical film waveguide with a first optically transparent layer (a) (according to Figure 1) on a second optically transparent layer (b) (according to Figure 1) with a lower refractive index, and wherein (1) the isotropically emitted luminescence or (2) luminescence that is incoupled into the optically transparent layer (a) and outcoupled by a grating structure (c) or luminescence comprising both parts (1) and (2) is measured simultaneously.

67. **(Previously Presented)** A method according to claim 64, wherein, for the generation of said luminescence, a luminescent dye or a luminescent nano-particle is used as a luminescence label, which can be excited and emits at a wavelength between 300 nm and 1100 nm.

68. **(Original)** A method according to claim 67, wherein the luminescence label is bound to the analyte or, in a competitive assay, to an analyte analogue or, in a multi-step assay, to one of the binding partners of the immobilized biological or biochemical or synthetic recognition elements or to the biological or biochemical or synthetic recognition elements.

69. **(Previously Presented)** A method according to claims 67, wherein a second or more luminescence labels of similar or different excitation wavelength as the first luminescence label and similar or different emission wavelength are used.

70. **(Original)** A method according to claim 69, wherein the second or more luminescence labels can be excited at the same wavelength as the first luminescence label, but emit at other wavelengths.

71. **(Original)** A method according to claim 69, wherein the excitation and emission spectra of the applied luminescent dyes do not overlap or overlap only partially.

72. **(Original)** A method according to claim 69, wherein charge or optical energy transfer from a first luminescent dye acting as a donor to a second luminescent dye acting as an acceptor is used for the detection of the analyte.

73. **(Previously Presented)** A method according to claim 64, wherein, besides determination of one or more luminescences, changes of the effective refractive index on the measurement areas are determined.

74. **(Previously Presented)** A method according to claim 64, wherein the one or more luminescences and / or determinations of light signals at the excitation wavelengths are performed polarization-selective.

75. **(Previously Presented)** A method according to claim 64, wherein the one or more luminescences are measured at a polarization that is different from the one of the excitation light.

76. **(Previously Presented)** A method according to claim 64 for the simultaneous or sequential, quantitative or qualitative determination of one or more analytes of the group comprising antibodies or antigens, receptors or ligands, chelators or "histidin-tag components", oligonucleotides, DNA or RNA strands, DNA or RNA analogues, enzymes, enzyme cofactors or inhibitors, lectins and carbohydrates.

77. **(Previously Presented)** A method according to claim 64, wherein the samples to be examined are naturally occurring body fluids, such as blood, serum, plasma, lymphe or urine, or egg yolk.

78. **(Previously Presented)** A method according to claim 64, wherein the samples to be examined are optically turbid liquids or surface water or soil or plant extracts or bio- or process broths.

79. **(Previously Presented)** A method according to claim 64, wherein the samples to be examined are taken from biological tissue.

80. **(Currently Amended)** A ~~The use of a~~ method comprising determining either quantitatively or qualitatively, with the method according to claim 64, ~~for the quantitative or qualitative determination of~~ chemical, biochemical or biological analytes in screening methods in pharmaceutical research, combinatorial chemistry, clinical and preclinical development, for real-time binding studies and the determination of kinetic parameters in affinity screening and in research, for qualitative and quantitative analyte determinations, especially for DNA- and RNA analytics and for the determination of genomic or proteomic differences in the genome, such as single nucleotide polymorphisms, for the measurement of protein-DNA interactions, for the determination of control mechanisms for mRNA expression and for the protein (bio)synthesis, for the generation of toxicity studies and the determination of expression profiles, especially for the determination of biological and chemical marker compounds, such as mRNA, proteins, peptides or small-molecular organic (messenger) compounds, and for the determination of antibodies, antigens, pathogens or bacteria in pharmaceutical product development and research, human and veterinary diagnostics, agrochemical product development and research, for symptomatic and pre-symptomatic plant diagnostics, for patient stratification in pharmaceutical product development and for the therapeutic drug selection, for the determination of pathogens, nocuous agents and germs, especially of salmonella, prions and bacteria, in food and environmental analytics.

81. **(Previously Presented)** A device according to claim 7, wherein laterally separated measurement areas (d) are generated by laterally selective deposition of biological or biochemical or synthetic recognition elements on said sensor platform.

82. **(Previously Presented)** A device according to claim 7, wherein the material of the tightly sealing layer (g) in contact with the sensor platform is self-adhesive.

83. **(Previously Presented)** A device according to claim 7, wherein the material of the tightly sealing layer (g) in contact with the sensor platform comprises a polysiloxane.

84. **(Previously Presented)** A device according to claim 7, wherein 5 - 1000, preferably 10 - 400 measurement areas are located in one sample compartment.

85. **(Previously Presented)** A device according to claim 7, wherein an individual measurement area in a sample compartment occupies an area of 0.001 - 6 $mm^2$, wherein different measurement areas can have similar or different size.

86. **(Previously Presented)** A device according to claim 7, wherein the sample compartments have a volume of 100 nl - 1 ml each.

87. **(Previously Presented)** A device according to claim 7, wherein, at the side facing away from the optically transparent layer (a), the sample compartments are closed except for inlet and outlet openings for the supply or removal of samples and optional additional reagents, and wherein the supply or removal of samples and optional additional reagents is performed in a closed flow-through system, and wherein in case of liquid supply to measurement areas or segments with common inlet and outlet openings said inlet and outlet openings are preferably addressed row by row or column by column.

88. **(Previously Presented)** A device according to claim 7, wherein the supply of samples and optional additional reagents is performed in parallel or crossed micro channels, affected by pressure differences or by electric or by electromagnetic potentials.

89. **(Previously Presented)** A device according to claim 7, wherein the sample compartments have openings for the locally addressed supply or removal of samples or other reagants at the side facing away from the optically transparent layer (a).

90. **(Previously Presented)** A device according to claim 7, wherein compartments are provided for reagents, which are wetted and brought into contact with the measurement areas during the assay.

91. **(Previously Presented)** A device according to claim 7, wherein optically or mechanically recognizable marks are provided on the sensor platform, in order to facilitate the adjustment in an optical system and / or to facilitate the combination of the sensor platform with the layer (g) comprising the recesses for the sample compartments.

92. **(Previously Presented)** An analytical system for the determination of one or more luminescences, comprising

a. at least one excitation light source

b. a device according to claim 7

c. at least one detector for recording the light emanating from the at least one or more measurement areas (d) on the sensor platform.